

PULSE NUCLEATION ENHANCED NUCLEATION TECHNIQUE FOR  
IMPROVED STEP COVERAGE AND BETTER GAP FILL FOR WCVD  
PROCESS

ABSTRACT OF THE DISCLOSURE

[0066] A process and an apparatus is disclosed for forming refractory metal layers employing pulse nucleation to minimize formation of a concentration boundary layer during nucleation. The surface of a substrate is nucleated in several steps. Following each nucleation step is a removal step in which all reactants and by-products of the nucleation process are removed from the processing chamber. Removal may be done by either rapidly evacuating the processing chamber, rapidly introducing a purge gas therein or both. After removal of the process gas and by-products from the processing chamber, additional nucleation steps may be commenced to obtain a nucleation layer of desired thickness. After formation of the nucleation layer, a layer is formed adjacent to the nucleation layer using standard bulk deposition techniques.